## AMENDMENTS TO THE DRAWINGS

The drawings have been amended to correct minor informalities. Specifically, Figures 18 and 19 of the drawings have been amended to comply with the requirements of 37 C.F.R. § 1.83 by removing handwritten corrections. Applicant asserts that no new subject matter is added by way of these amendments.

## REMARKS

Please reconsider the application in view of the above amendments and the following remarks. Applicant thanks the Examiner for carefully considering this application.

**Disposition of Claims**

Claims 1-28 are currently pending in this application. Claims 15-21 have been canceled by this reply. Of the remaining claims, claims 1, 8, and 22 are independent. The remaining claims depend, directly or indirectly, from claims 1, 8, and 22.

**Drawings**

The drawings are objected to under 37 C.F.R. § 1.83(a) as failing to show every feature of the invention specified in the claims. This rejection is respectfully traversed.

Specifically, the Examiner objects to the drawings for failing to show "moving on to another group of memory sections distant from the next scheduled group." Applicant respectfully disagrees.

"Moving on to another group of memory sections distant from the next scheduled group" defines the action taken by the garbage collector if a concurrently executing application is operating (*i.e.,* dirtying memory sections) in a schedule memory section (*see* Specification, page 25, lines 23-25). Because the garbage collector cannot operate in the same memory area as an executing application, the garbage collector preserves the indicators in that memory area and returns to summarize (collect) that memory area at a later time, after the application has completed execution in that memory area (*i.e.,* the garbage collector collects scheduled groups of memory areas out of order in order to operate concurrently with an executing application). Applicants assert that the flow charts shown in Figures 13A and 13B, clearly illustrates that the mutator (*e.g.,* an executing application) ceases executing in a memory area before the garbage

collector begins collector efforts in that memory area by the use of the dashed line which distinguishes operation of the mutator and operation of the garbage collector. Applicants assert that such a separation between the mutator's actions and the garbage collector's actions as shown in Figures 13A and 13B illustrates that the two processes cannot operate at the same time in the same memory area. Thus, "moving on to a group distant from the next scheduled group," while not explicitly stated in text is most definitely shown in the figures of the present application.

In addition, Figures 18 and 19 are objected to for containing handwritten corrections. Figures 18 and 19 have been amended to comply with the requirements of 37 C.F.R. § 1.83. Accordingly, acceptance of the drawings and withdrawal of these objections is respectfully requested.

**Rejections under 35 U.S.C. § 112**

Claims 1-14 and 22-28 stand rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement. This rejection is respectfully traversed.

The Examiner asserts that the limitation reciting "scanning the at least one dirtied memory section and updating the card table indicators or remembered sets of corresponding objects, wherein updating the card table indicators or remembered sets of corresponding objects comprises storing, in the card table or remembered sets, at least one location of referencing objects that reference the corresponding objects," is not taught by the Specification. In particular, the Examiner asserts that Specification does not teach that the aforementioned limitation of updating the card table indicators or remembered sets of corresponding objects occurs while scanning a *dirtied* memory section (*see* Office Action mailed February 7, 2007, page 4). Applicant respectfully disagrees.

Specifically, as described on the bottom of page 15 of the Instant Specification, a memory section becomes "dirtied" when the mutator adds or modifies a reference contained by a card. When a card is "dirtied" in this manner, the mutator makes a card-table entry to identify the dirtied card (*see* Specification, page 15, lines 28-30). Thus, scanning a dirtied memory section, by definition, involves scanning any memory section that contains an *added or modified reference*.

Further, page 22, lines 3-6, of the Specification recites "[t]he next step is to process the next car, the one whose index is 1.2. Conventionally, this would not occur until some collection cycle after the one during which car 1.1 is collected. For the sake of simplicity we will assume that the mutator has not changed any references into the generation in the interim." And, page 24, lines 22-25 states "Of course, subsequent collection cycles will not in general proceed, as in the illustrated cycles, without any reference changes by the mutator and without any addition of further objects."

Thus, it is clear that the explanation of Figures 12A-12J also applies to dirtied memory sections. In fact, considering that it is known (from the reading of the Specification) that a mutator operates in between collections, garbage collection usually takes place in memory sections in which the mutator has added or modified references (*i.e.*, in dirty memory sections). Accordingly, it is true that in the Figures, the same operations occur. The *only* reason that Figures 12A-12J do not explicitly recite how the collected memory sections become "dirtied" in between collections is *for simplicity* of explanation of embodiments of the present invention as recited in the specification itself (*see* Specification, page 22, lines 3-6).

In addition, Figures 18-19, Steps 330, and Figure 20, Step 350, recite in part "scan cards that have dirty entries in V', updating RS's..." (where RS's means remembered sets). Clearly,

Figures 18-20 provide support for updating remembered sets as recited in the independent claims of the present invention in *dirtied* memory areas.

In view of the above, the Instant Specification makes it clear that card table indicators or remembered sets are updated while scanning dirtied memory sections. Therefore, independent claims 1, 8, and 22 are fully supported by the Specification. Dependent claims are patentable for at least the same reasons. Accordingly, withdrawal of this rejection is respectfully requested.

**Conclusion**

Applicant believes this reply is fully responsive to all outstanding issues and places this application in condition for allowance. If this belief is incorrect, or other issues arise, the Examiner is encouraged to contact the undersigned or his associates at the telephone number listed below. Please apply any charges not covered, or any credits, to Deposit Account 50-0591 (Reference Number 03226/936001).

Dated: March 30, 2007                    Respectfully submitted,

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Attachments   (Replacement Sheets for Figures 18 and 19)